J. W. COPLEY AND A. C. THORNTON.

MAINTAINING THE CONTENTS OF CONTAINERS, CASES, RESERVOIRS, OR THE LIKE, CARRIED BY AIRCRAFT, AT A REQUIRED TEMPERATURE.

APPLICATION FILED MAR. 16, 1920.

1,359,967.

Patented Nov. 23, 1920.

2 SHEETS—SHEET 1.

FIG. 1.

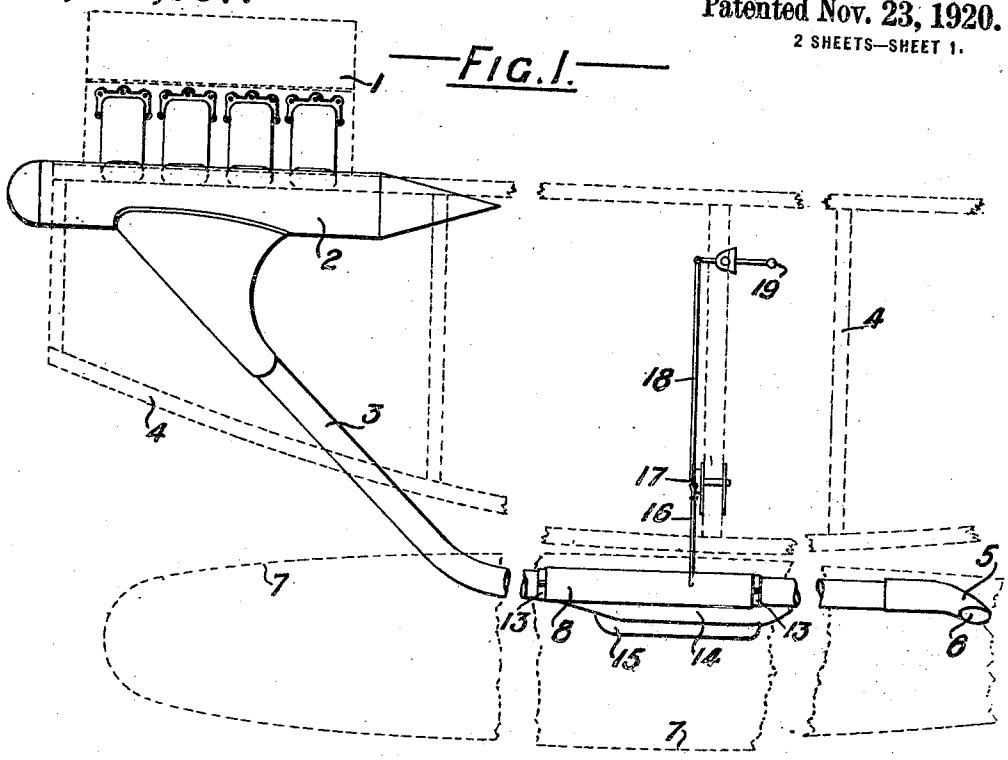


FIG. 2.

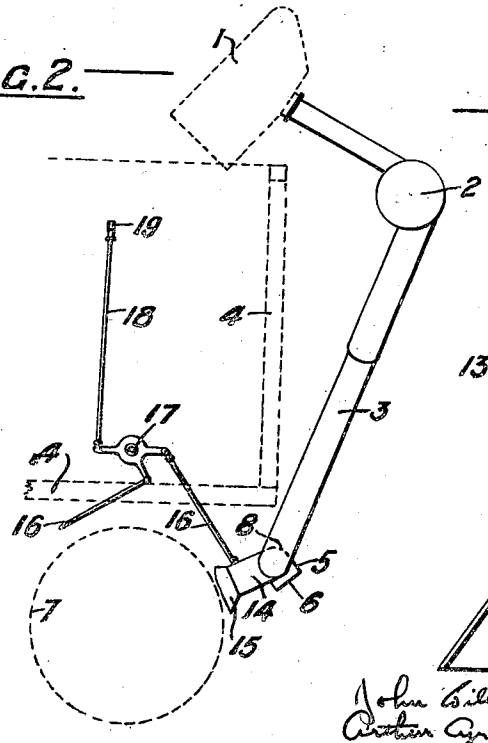
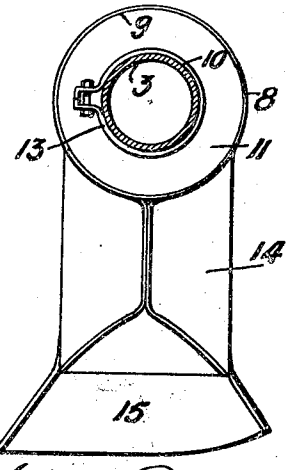


FIG. 4.



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2 SHEETS—SHEET 2.

FIG. 3.

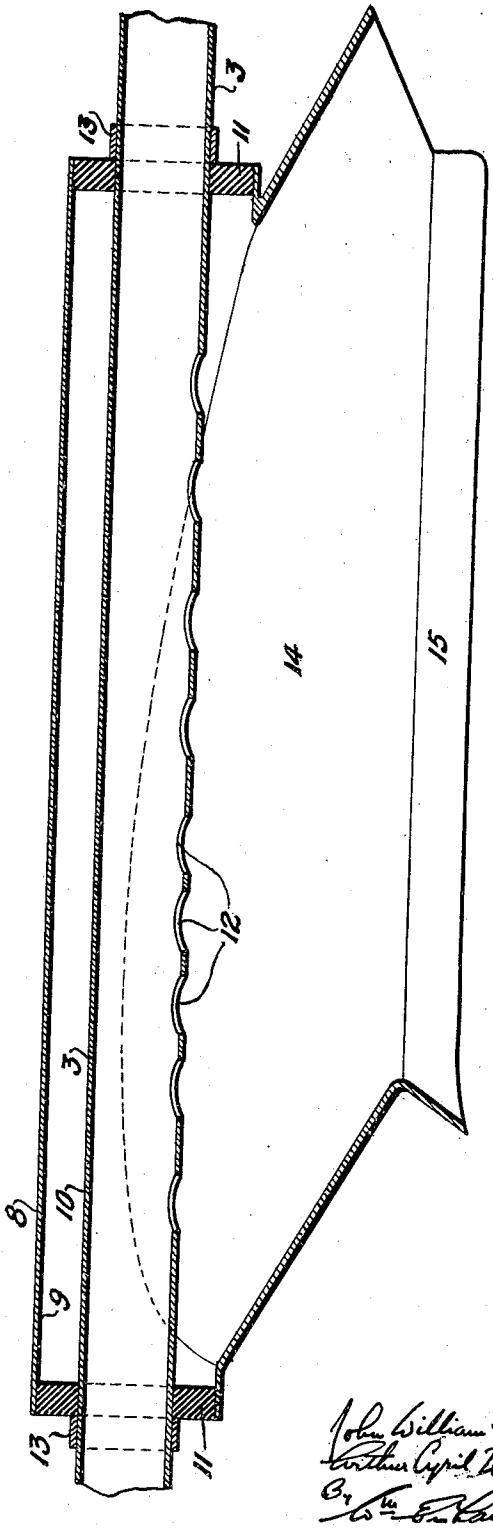
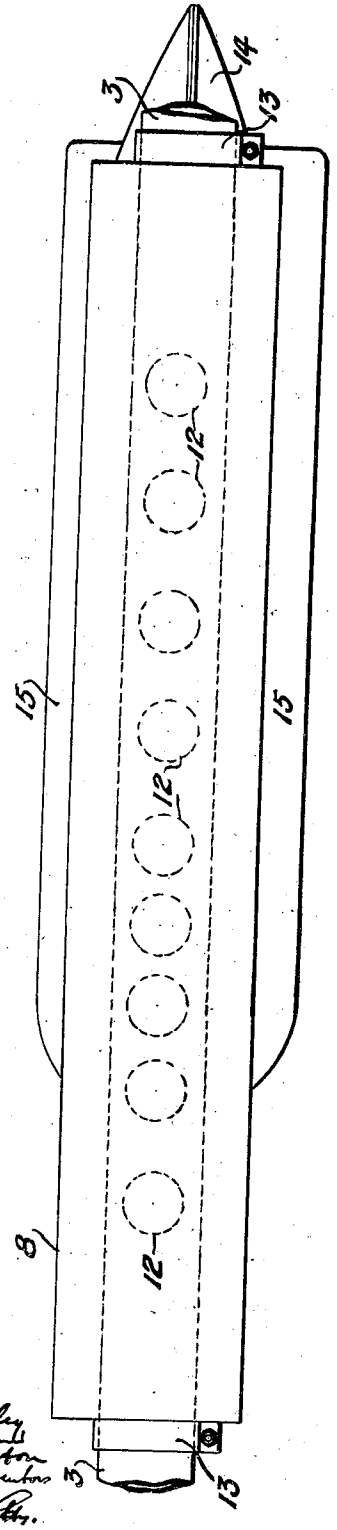


FIG. 5.



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UNITED STATES PATENT OFFICE.

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MAINTAINING THE CONTENTS OF CONTAINERS, CASES, RESERVOIRS, OR THE LIKE, CARRIED BY AIRCRAFT, AT A REQUIRED TEMPERATURE.

1,359,967. Specification of Letters Patent. **Patented Nov. 23, 1920.**

Application filed March 16, 1920. Serial No. 366,432.

To all whom it may concern:

Be it known that we, JOHN WILLIAM COPLEY and ARTHUR CYRIL THORNTON, subjects of the King of Great Britain, residing at Leeds, Yorkshire, England, have invented certain new and useful Improvements in Maintaining the Contents of Containers, Cases, Reservoirs, or the like, Carried by Aircraft, at a Required Temperature, of which the following is a specification.

This invention relates to providing improved means for heating the contents of containers, cases, reservoirs, or the like when carried on aircraft, such as torpedoes, hereafter generally referred to as torpedoes.

It has already been considered necessary to provide heating means for some containers, such as torpedoes, which should be calculated to maintain certain portions of the torpedo body, when carried by aircraft, between certain specified limits of temperature; means have accordingly been proposed by which this end may be attained, such for example as an electrically heated jacket applied to the exterior surface of the container or torpedo case, and it has been suggested that exhaust gases might be delivered from the engine in the form of a jet or jets, which latter should impinge against the portion of the torpedo case at that part which requires heating.

Now the present invention refers to the latter mode of applying heat at the required part, the object of the said invention being to provide means by which the application of such heat by exhaust gases may be rendered controllable and thereby the temperature of the portion of the torpedo case to which heat is so applied may be maintained within assigned limits, the absence of such control having been a grave disadvantage incidental to this mode of heating.

Considering the present invention broadly and in its more simple character, the exhaust pipe conveying the exhaust gases or a portion of the exhaust gases from the engine, is constructed so that it has generally two outlets, one of these outlets which we will term the branch outlet, being arranged as hereinafter described, so that it may be caused to direct a portion of the exhaust gases upon that part of the torpedo body which is required to be heated, while the other and more direct outlet is situated at a distance from the torpedo body.

To enable this result to be effectively obtained, the above mentioned branch outlet is provided with a suitably shaped mouth, and is also made capable of angular adjustment, by means of levers and connections operated from the fuselage of the aircraft.

If desired a valve or valves of any suitable or well known construction may also be applied to govern either or both the outlets, and suitable means are provided by which such valve or valves could be operated by the occupants of the aircraft, so that by opening or closing such valves, the temperature of that portion of the torpedo case acted upon by the exhaust gases from the before mentioned branch outlet, would be rendered capable of still further regulation.

In order to enable the invention to be readily understood, we will describe one means by which the above result may be carried out.

Referring now to the accompanying drawings, Figure 1 illustrates diagrammatically in elevation the arrangement of the improved heating apparatus with its operating levers and connection to an aircraft engine.

Fig. 2 is a partial front elevation of Fig. 1.

Fig. 3 is a sectional longitudinal elevation of the improved branch outlet above mentioned, drawn to a larger scale than the previous figures.

Fig. 4 is an end elevation, and Fig. 5 a plan view of the same.

Referring more particularly to Figs. 1 and 2 the exhaust gases from a bank of cylinders 1 pass into a common chamber 2 from which they are conducted by a pipe 3 which may extend conveniently below the fuselage 4 of an aircraft and adjacent to the bottom surface thereof, and the end 5 of such a pipe 3 may be slightly curved downward

away from the fuselage 4 and be open, thus providing a direct outlet 6 for the exhaust gases.

In the length of such a pipe 3 and above the torpedo body 7, which may be suspended beneath the fuselage 4 in the usual manner, is fitted a sleeve 8 of a requisite length, the interior surface 9 of the sleeve 8 being at a distance from the exterior surface 10 of the pipe 3, and the ends of the said sleeve 8 fitted with collars 11 or their equivalent mounted upon the pipe 3 so that the sleeve 8 can be revolved about the axis of the pipe 3. Within the sleeve 8 the pipe is formed with holes 12 through which the exhaust gases may pass into the sleeve 8.

Collars or clips 13 are also provided for the purpose of maintaining the endwise position of the sleeve 8 upon the pipe 3, and at the same time allowing it to be capable of angular adjustment about the axis of the pipe 3.

The sleeve 8 carries and communicates with an elongated chamber 14 formed or provided with an elongated mouth 15 so that the gases passing from the sleeve 8 into the chamber 14 find their exit by the mouth 15 aforesaid.

Since the sleeve 8 can be angularly adjusted about the pipe 3, means are provided by which such adjustment can be effected from within the fuselage 4, the sleeve 8 being connected by a link 16 to a rocking member 17 fitted with any convenient frictional device. By duplicating the lever 16 a second sleeve 8 controlling the exhaust gases from another bank of cylinders can be adjusted as hereinafter described. The rocking member 17, by a further link 18, is connected to an operating lever 19. It will be readily understood that by means of the operating lever 19 the sleeve 8 can be angularly adjusted about the pipe 3 so as to direct the exhaust gases issuing from its elongated mouth 15, more or less directly upon that portion of the torpedo case 7 which is to be heated, or the sleeve 8 can be adjusted so that the gases issuing from the elongated mouth 15 carried by the sleeve 8 will not impinge upon the torpedo case, and therefore as the current of gases is caused to impinge more or less directly upon the torpedo case, so will the latter be more or less heated as required.

The exhaust gases from say one bank of cylinders may be so controlled and utilized, while the exhaust gases from an opposite bank of cylinders may pass by another similar pipe correspondingly fitted with a sleeve carrying an elongated mouth, the exhaust gases from which may act upon another part of the torpedo-case, and the sleeves on both of such exhaust pipes can be simultaneously controlled by connecting both sleeves, by rods or links, to a rocking member, and then by means of the operating lever 19 both the sleeves can be correspondingly adjusted in position.

The drawings show a convenient construction, but obviously in some cases the whole of the exhaust gases may pass away by the elongated mouth 15 and the more direct outlet 6 be dispensed with.

In concluding this description it should be remarked that the construction of the invention in which a revoluble sleeve is employed as above described, enables, if desired, a heating jacket to be applied externally onto the torpedo case (for instance when the machine is not in flight, and in consequence hot exhaust gas is not available), such application of a heating jacket being rendered possible owing to the elongated mouth of the sleeve being capable of removal from close proximity to the torpedo case, by simply angularly adjusting the sleeve 8 so as to carry the elongated mouth 15 away from the torpedo case 7, and further as will have been already understood, this sleeve construction permits of the direction of application of the jet of exhaust gases being quickly and easily varied or entirely removed.

What we claim as our invention and desire to secure by Letters Patent is:—

1. In heating the contents of containers, cases, reservoirs, or the like, carried by aircraft, by exhaust gases delivered from the engine; an engine exhaust pipe having a sleeve tube adjustable about the axis of said exhaust pipe, said exhaust pipe having apertures through its wall within said sleeve, said sleeve having an open radially extending mouth through which exhaust gases may pass from said exhaust pipe, and means for adjusting said sleeve about the axis of said exhaust pipe to direct said exhaust gases onto or away from the part to be heated.

2. In heating devices having the features as claimed by claim 1; constructing the sleeve tube of larger internal diameter than the external diameter of the exhaust tube, closing the ends of said sleeve tube and mounting same on said exhaust tube so as to be capable of angular adjustment about the axis of said exhaust tube, so that said exhaust gases are permitted to pass through the extending mouth of the sleeve tube in whatever angular position it may be placed.

3. In heating the contents of containers, cases, reservoirs or the like, carried by aircraft, by exhaust gases delivered from the engine; an engine exhaust pipe having a sleeve tube adjustable about the axis of said exhaust pipe, said exhaust pipe having apertures through its wall within said sleeve, said sleeve having an open radially extending mouth through which exhaust gases may

pass from said exhaust pipe, a rocking member, a link to connect said rocking member to the radially extending portion of said sleeve tube, an operating lever and a connecting member between said operating lever and said rocking member to angularly adjust said sleeve tube about the said exhaust pipe.

In witness whereof we have hereunto set our hands in the presence of two witnesses.

JOHN WILLIAM COPLEY.
ARTHUR CYRIL THORNTON.

Witnesses:
HARRIS BOTTS,
EDWARD HAMILTON CLEMENTS.